

Section 3.1 and 3.2 – Checking Your understanding

Answer the following three questions, show as many steps as you need to, write clearly and neatly.

1. Simplify the Rational Expression, State the Domain Restrictions

$$\frac{2x^2 + 5xy + 3y^2}{4x^2 + 12xy + 9y^2}$$

Factor by Grouping

$$\frac{(2x^2 + 2xy)(+3xy + 3y^2)}{(4x^2 + 6xy)(+6xy + 9y^2)}$$

$$\frac{2x(x+y) + 3y(x+y)}{2x(2x+3y) + 3y(2x+3y)} \rightarrow \frac{\cancel{(2x+3y)}(x+y)}{\cancel{(2x+3y)}(2x+3y)}$$

D: $2x+3y \neq 0 \rightarrow \boxed{x \neq -\frac{3}{2}y}$
 $2x \neq -3y$
 $x \neq -\frac{3}{2}y$

$$\boxed{\frac{(x+y)}{(2x+3y)}}$$

2. Multiply the Rational Expressions, simplify if possible, state the Domain Restrictions

$$\frac{x^2 + 7x + 12}{x^2 + 2x - 8} \cdot \frac{x^2 - 3x + 2}{x^2 + 2x - 3}$$

$$\frac{\cancel{(x+3)}\cancel{(x+4)}}{\cancel{(x+4)}\cancel{(x-2)}} \cdot \frac{\cancel{(x-2)}\cancel{(x-1)}}{\cancel{(x+3)}\cancel{(x-1)}} \Rightarrow \boxed{1}$$

D: $x \neq -4, 2, -3, 1$

3. Divide and Multiply the Rational Expressions, simplify if possible, state the Domain Restrictions

$$\left(\frac{2x^2 - 5xy - 3y^2}{3abx - aby} \div \frac{x - 3y}{a^2b} \right) \cdot \frac{3x - y}{2x + y}$$

↑
this first

forgot to write this

$$\left(\frac{2x^2 - 6xy + 1xy - 3y^2}{ab(3x - y)} \right) \cdot \frac{3x - y}{2x + y}$$

$$\left(\frac{2x(x - 3y) + 1y(x - 3y)}{ab(3x - y)} \div \frac{x - 3y}{a^2b} \right) \cdot \frac{3x - y}{2x + y}$$

$$\left(\frac{\cancel{(2x + y)} \cancel{(x - 3y)}}{ab \cancel{(3x - y)}} \cdot \frac{a^2 \cancel{b}}{\cancel{x - 3y}} \right) \cdot \frac{\cancel{3x - y}}{\cancel{2x + y}}$$

$$\frac{a^2}{a} = \boxed{a}$$

Domain
now
because
multiplication

$$\begin{aligned} a &\neq 0 & x &\neq 3y \\ b &\neq 0 & x &\neq -\frac{y}{2} \\ x &\neq \frac{y}{3} \end{aligned}$$